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CORRIGENDUM

Comments on "Deadlock prevention and avoidance in FMS: a Petri net based approach"

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Abdallah et al. [1] proposed a deadlock prevention and deadlock avoidance policy for a class of Petri nets, S^4R. This class of nets allows major synchronisation patterns, such as generalized parallel and sequential mutual exclusion, frequently observed in FMS (flexible manufacturing systems) contexts. An efficient method for controlling minimal siphons of a given S^4R net was developed where local control places are added to the net.

Abdallah et al., however, did not cite a result in [2] correctly. Proposition 2 (shown below) in [1] said that if a net is live then it satisfies the max-cs property, while Proposition 12 (shown below) in [2] said that if a net is live then it satisfies the min-cs property.

Proposition 2 [1] If N is live then N satisfies the max-cs property [2].

Proposition 12 [2] If a marked Petri net (N, M_0) is live then it satisfies the min cs-property.

A proof of *Proposition 12* is provided in [2]. To understand the difference between the max-cs and the min-cs property, the following definitions are useful. *A shared place p* ($|p^\bullet| \geq 2$) *is said to be homogeneous if and only if :* $\forall t,t' \in p^\bullet$, *W(p, t) = W(p, t') = W(p).* $\forall p \in D$, *p is called max-marked (min-marked) under M if* $\max_{t\in p^\bullet} W(p,t) \leq M(p)$ $\left(\min_{t\in p^\bullet} W(p,t) \leq M(p)\right)$. *D is said to be max-controlled (min-controlled), if and only if* $\forall M \in R(N, M_0)$, $\exists p \in D$, *p is max-marked (min-marked). N is said to be max-controlled (min-controlled) if and only if each minimal siphon of (N,* M_0*) is max-controlled (min-controlled). A marked Petri net (N,* M_o*) is said to be satisfying the max-controlled (min-controlled) siphon property, in short, max-cs property (min-cs property) if, and only if, each minimal siphon of (N,* M_0*) is max-controlled (min-controlled).*

For more details, please refer to [1, 2]. The example in Fig. 1 contradicts the statement: "a live Petri net N satisfies the max controlled siphon property". There is only one problematic siphon $D=\{r_1, r_2, p_3, p_5\}$. None of places in D is max-marked: r_1 (r_2) is not max-marked and $M(p_5)=M(p_3)=0$; both p_5 and p_3 are not max-marked. Thus, D is not max-controlled, yet the net system is live. However, D is

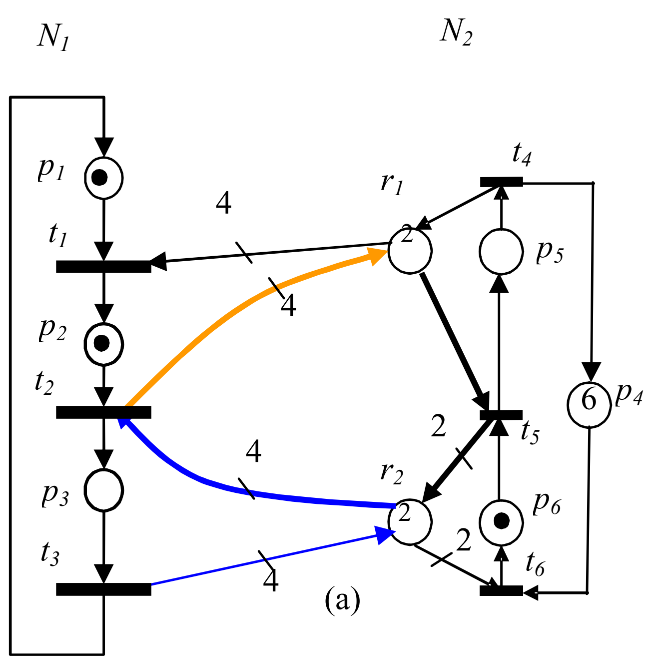

Fig. 1 A live GPN where the only problematic siphon $D=\{r_1, r_2, p_3, p_5\}$ is not max-controlled

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min-marked (consistent with Proposition 12 in [2]) since $M(r_1) = 2 \geq \min_{t \in p\bullet} W(p, t)$=1. r_2 is also min-marked and $M(p_5)$=$M(p_3)$ =0; both p_5 and p_3 are not min-marked.

Thus, the example verifies that if the net is live, then the min-controlled (rather than the max-controlled) property is true. Please note that a max-controlled siphon is also a min-controlled siphon and when the valuation of the net is homogeneous, a min-controlled siphon is also a max-controlled siphon. As a result, Theorem 1 in [1] (Let (N, M_0) be a marked S^4R net, N is live under M_0 *if and only if* N satisfies the max-cs property) is incorrect.

However, all the rest results included in [1] obtained using S^4R nets are correct and remain true [3, 4]. The most important result that is used in the paper [1] is Proposition 3, which states that: "if N satisfies the max-cs property then N is deadlock free" A proof of proposition 3 is provided in [2].

Therefore, the above results are not contradicted by the argument and example discussed in this technical note.

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